

The DAWN Report

December 28, 2010

Highlights of the 2009 Drug Abuse Warning Network (DAWN) Findings on Drug-Related Emergency Department Visits

In Brief

- In 2009, there were nearly 4.6 million drug-related emergency department (ED) visits of which about one half (49.8 percent, or 2.3 million) were attributed to adverse reactions to pharmaceuticals and almost one half (45.1 percent, or 2.1 million) were attributed to drug misuse or abuse
- In 2009, ED visits resulting from the misuse or abuse of pharmaceuticals occurred at a rate of 405.4 visits per 100,000 population compared with a rate of 317.1 per 100,000 population for illicit drugs
- ED visits involving misuse or abuse of pharmaceuticals increased 98.4 percent between 2004 and 2009, from 627,291 visits in 2004 to 1,244,679 visits in 2009
- ED visits involving adverse reactions to pharmaceuticals taken as prescribed increased 82.9 percent between 2005 and 2009, from 1,250,377 visits in 2005 to 2,287,273 visits in 2009

In 2009, nearly 4.6 million emergency room visits were connected to misuse or abuse of drugs, adverse reactions to drugs, or other drug-related consequences.¹ The Drug Abuse Warning Network (DAWN) provides estimates of the number of emergency room admissions associated with particular drugs. DAWN data on individuals who experience drug-related medical emergencies severe enough to require treatment in an emergency department (ED) provide important information on the types of drugs involved in substance abuse and the characteristics of individuals suffering the negative consequences of drug use. The DAWN data reflect the commitment of the Substance Abuse and Mental Health Services Administration (SAMHSA) to provide important health statistics that inform local, State, and Federal public policy by providing a measure of the public health impact from the use of

alcohol, illicit drugs, and pharmaceuticals. Such data offer a unique insight into the Nation’s substance misuse or abuse problems and thereby help guide prevention, intervention, and treatment programs at the State and local levels.

DAWN data also provide a gauge of the impact of drug-related ED visits on the health care system. The U.S. Food and Drug Administration uses DAWN data for continued surveillance of pharmaceuticals, and the pharmaceutical industry uses these data for post-marketing surveillance of prescription and over-the-counter drugs, for active monitoring of adverse events associated with medications, and for assessing the abuse potential for labeling and scheduling decisions.

This issue of *The DAWN Report* presents highlights of national estimates of drug-related visits to hospital EDs for 2009, with trends from 2004 to 2009. The findings in this report, including significance tests, are drawn from the DAWN 2009 ED trend tables (available online at <https://dawninfo.samhsa.gov/data/>).²

Overview

In 2009, there were nearly 4.6 million drug-related ED visits of which about one half (49.8 percent, or 2.3 million) were attributed to adverse reactions to pharmaceuticals and almost one half (45.1 percent, or 2.1 million) were attributed to drug misuse or abuse (Table 1).^{3,4} Of the 2.1 million ED visits involving drug misuse or abuse, 1.2 million visits involved the misuse or abuse of pharmaceuticals, almost 1.0 million were related to illicit drugs, and about 200,000 visits were associated with underage drinking.^{5,6,7} Alcohol was involved in more than 650,000 visits, or slightly less than one third (31.8 percent) of visits resulting from drug misuse or abuse.⁸

Patients aged 20 or younger accounted for 19.1 percent (877,802 visits) of all drug-related ED visits in 2009. About one half (415,351 visits) of these visits involved drug misuse or abuse, representing a rate of 473.3 ED visits per 100,000 population aged 20 or younger. The majority of drug-related

Table 1. Drug-Related Emergency Department (ED) Visits, by Type of Visit: 2009

Type of Drug-Related ED Visit	Number of ED Visits*	Percent*
Total Drug-Related ED Visits	4,595,263	100.0
Drug Misuse or Abuse	2,070,439	45.1
Misuse or Abuse of Pharmaceuticals	1,244,679	27.1
Illicit Drug Use	973,591	21.2
Alcohol Involvement**	658,263	14.3
Alcohol Involvement with Drug Use	519,650	11.3
Underage Drinking	199,429	4.3
Adverse Reactions	2,287,273	49.8

* Because each visit may represent multiple types of visits and multiple types of drugs, the estimates add to more than the total number of visits and the percentages add to more than 100.

** Alcohol involvement includes use of alcohol in combination with other drugs for patients of all ages and use of alcohol only for persons aged 20 or younger. Underage drinking includes both use of alcohol in combination with other drugs and use of alcohol only for persons aged 20 or younger.

Source: 2009 SAMHSA Drug Abuse Warning Network (DAWN).

Table 2. Misused or Abused Drugs Most Commonly Involved in Emergency Department (ED) Visits: 2009

Drugs	Number of ED Visits	Number of ED Visits per 100,000 Population
Alcohol in Combination with Other Drugs*	519,650	169.3
Underage Drinking**	199,429	227.2
Illicit Drugs	973,591	317.1
Cocaine	422,896	137.7
Marijuana	376,467	122.6
Heroin	213,118	69.4
Pharmaceuticals	1,244,679	405.4
Pain Relievers	595,551	194.0
Narcotic Pain Relievers	397,160	129.4
Oxycodone Products	175,949	57.3
Hydrocodone Products	104,490	34.0
Drugs to Treat Insomnia and Anxiety	433,600	141.2
Benzodiazepines	373,328	121.6
Antidepressants	104,940	34.2

* Use of alcohol in combination with other drugs is recorded by DAWN for patients of all ages.

** Underage drinking includes both use of alcohol in combination with other drugs and use of alcohol only for persons aged 20 or younger.

Source: 2009 SAMHSA Drug Abuse Warning Network (DAWN).

ED visits were made by patients aged 21 or older (80.9 percent, or 3,717,030 visits). Of these, slightly less than one half (1,654,784 visits) involved drug misuse or abuse, reflecting a rate of 754.8 visits per 100,000 population aged 21 or older.

ED Visits Involving Drug Misuse or Abuse: 2009

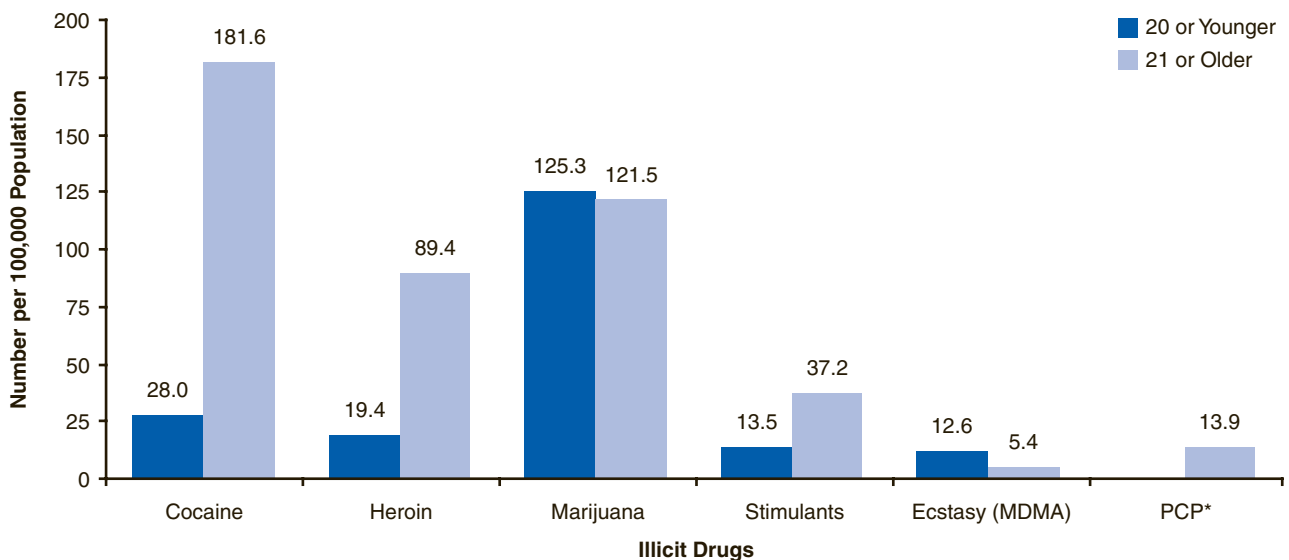
In 2009, ED visits resulting from the misuse or abuse of pharmaceuticals occurred at a rate of 405.4 visits per 100,000 population compared with a rate of 317.1 per 100,000 population for illicit drugs (Table 2). About one half of ED visits for misuse or abuse of pharmaceuticals involved pain relievers (194.0 visits per 100,000 population), which were most commonly narcotic pain relievers (e.g., oxycodone and hydrocodone products; 129.4 visits per 100,000 population). More than one third of ED visits for misuse or abuse of pharmaceuticals involved drugs to treat insomnia and anxiety (141.2 visits per 100,000 population), primarily benzodiazepines (e.g., alprazolam, clonazepam, and diazepam; 121.6 visits per 100,000 population).

For ED visits related to the use of illicit drugs, cocaine and marijuana had the highest rates involvement at 137.7 and 122.6 visits per 100,000 population, respectively. ED visits involving alcohol in combination with other drugs occurred at a rate of 169.3 visits per 100,000 population for all age groups. ED visits resulting from underage drinking occurred at a rate of 227.2 visits per 100,000 population aged 20 or younger in 2009.

ED Visits Involving Drug Misuse or Abuse, by Age: 2009

The majority of drug-related ED visits in 2009 were made by patients aged 21 or older; of a total 4,595,263 drug-related ED visits, 3,717,030 (80.9 percent) were made by patients aged 21 or older. Among ED visits made by patients aged 20 or younger resulting from drug misuse or abuse, after alcohol, marijuana was the most commonly involved illicit drug (125.3 visits per 100,000 population) (Figure 1). For this age group, the rates for ED visits related to all other illicit drugs and all major pharmaceuticals were less than 30 visits per 100,000 population (Figures 1 and 2).

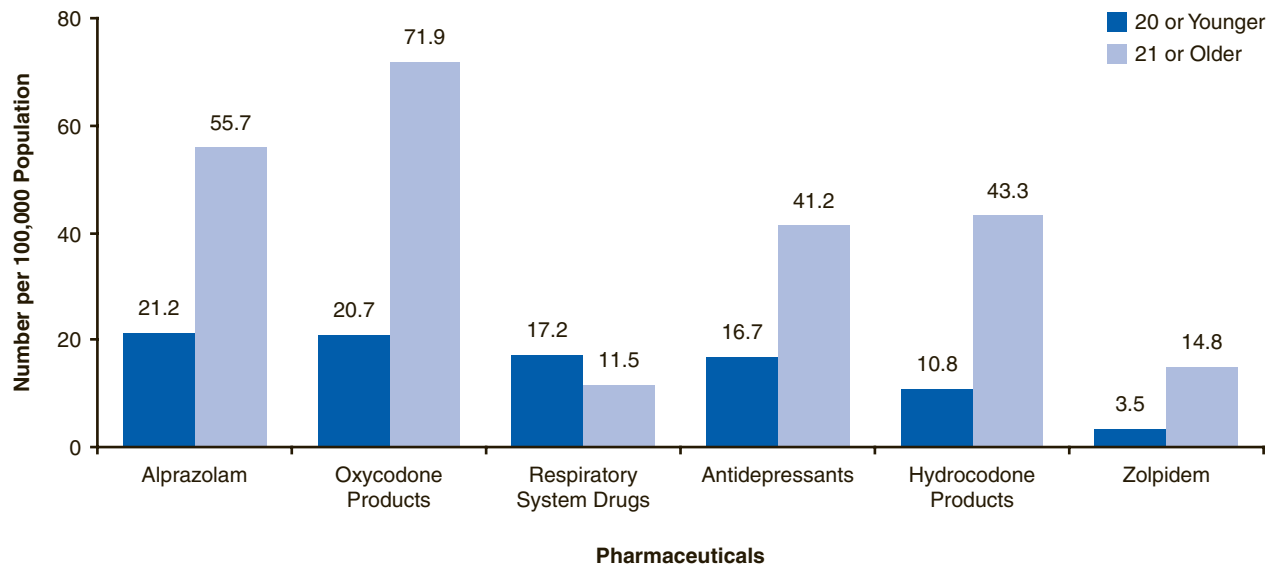
Figure 1. Emergency Department (ED) Visits Involving Major Illicit Drugs, by Age and Drug: 2009



* Rate is suppressed due to low statistical precision.

Source: 2009 SAMHSA Drug Abuse Warning Network (DAWN).

Figure 2. Emergency Department (ED) Visits Involving Misuse or Abuse of Select Pharmaceuticals, by Age and Pharmaceutical: 2009



Source: 2009 SAMHSA Drug Abuse Warning Network (DAWN).

For adults aged 21 or older, cocaine was involved in 398,229 visits, or 181.6 visits per 100,000 population. In this age group, marijuana was involved in 121.5 visits per 100,000 population, heroin was involved in 89.4 visits per 100,000 population, and stimulants (i.e., amphetamines and methamphetamines) were involved in 37.2 visits per 100,000 population (Figure 1). Among pharmaceuticals, the narcotic pain reliever oxycodone appeared in 71.9 visits per 100,000 population, and the benzodiazepine alprazolam was found in 55.7 visits per 100,000 population (Figure 2). Antidepressants and hydrocodone products each appeared in slightly more than 40 visits per 100,000 population.

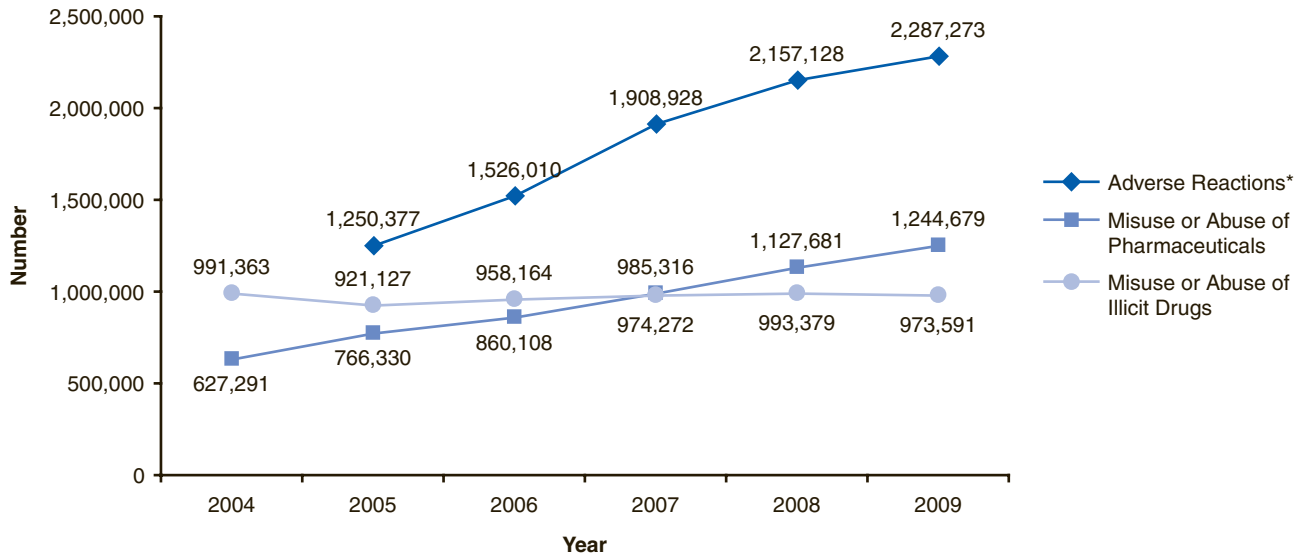
Trends in ED Visits Involving Drug Misuse or Abuse: 2004 and 2009

The total number of drug-related ED visits increased 81 percent from 2004 (2.5 million visits) to 2009 (4.6 million visits). ED visits involving misuse or abuse of pharmaceuticals increased 98.4 percent between 2004 and 2009, from 627,291 visits in 2004 to 1,244,679 visits in 2009

(Figure 3). The corresponding rates of ED visits related to misuse or abuse of pharmaceuticals per 100,000 population were 214.1 in 2004 and 405.4 in 2009 (Table 3). Unlike pharmaceuticals, the level of ED visits involving illicit drug use was generally stable across that time period. ED visits resulting from alcohol involvement with drug use and underage drinking were also stable.

Several of the more commonly misused or abused pharmaceuticals were found to have increased more than 100 percent in ED visit involvement from 2004 to 2009 (Table 4). Of these, the largest increases were observed for oxycodone products (242.2 percent increase), alprazolam (148.3 percent increase), and hydrocodone products (124.5 percent increase). Large percent increases occurred among particular drugs contributing to relatively fewer visits: antidiabetic agents such as insulin (223.6 percent increase) and zolpidem, a drug to induce sleep (154.9 percent increase). Among ED visits involving illicit drugs, only those involving Ecstasy increased more than 100 percent from 2004 to 2009 (123.2 percent increase).

Figure 3. Drug-Related Emergency Department (ED) Visits, by Type of Visit: 2004 to 2009*



* Data for ED visits involving adverse reactions to pharmaceuticals are not available for 2004.

Source: 2004 to 2009 SAMHSA Drug Abuse Warning Network (DAWN).

Table 3. Drug-Related Emergency Department (ED) Visits per 100,000 Population, by Type of Visit: 2004 to 2009

Type of Drug-Related ED Visit	2004	2005	2006	2007	2008	2009	Percent Change in Number of ED Visits, 2004 to 2009
Total Drug-Related ED Visits	866.0	1,017.4	1,152.7	1,325.8	1,440.2	1,496.8	81.1*
Drug Misuse or Abuse	552.5	546.5	583.7	624.5	657.0	674.4	27.9
Pharmaceuticals	214.1	259.1	288.1	326.7	370.5	405.4	98.4*
Illicit Drugs	338.3	311.5	320.9	323.1	326.4	317.1	-1.8
Alcohol Involvement**	230.3	178.3	193.4	210.4	215.8	214.4	-2.5
Alcohol Involvement with Drug Use	178.8	140.9	151.0	164.9	172.2	169.3	-0.8
Underage Drinking	238.5	183.6	211.6	225.4	217.2	227.2	-2.7
Adverse Reactions	***	422.8	511.1	633.0	708.7	745.0	82.9*
Accidental Ingestion	23.8	19.1	26.5	30.4	33.0	31.0	36.2*

* The change is statistically significant at the .05 level.

** Alcohol involvement includes use of alcohol in combination with other drugs for patients of all ages and use of alcohol only for persons aged 20 or younger. Underage drinking includes both use of alcohol in combination with other drugs and use of alcohol only for persons aged 20 or younger.

*** Data for ED visits involving adverse reactions to pharmaceuticals are not available for 2004. The percent change is calculated from 2005 to 2009.

Source: 2004 to 2009 SAMHSA Drug Abuse Warning Network (DAWN).

Table 4. Select Misused or Abused Drugs with Increasing Involvement in Emergency Department (ED) Visits: 2004 to 2009

Drugs	Number of ED Visits in 2009	Percent Increase in Number of ED Visits, 2004 to 2009
Drugs to Treat Insomnia or Anxiety: Zolpidem	35,438	154.9
Drugs to Treat Insomnia or Anxiety: Alprazolam	140,657	148.3
Drugs to Treat Insomnia or Anxiety: Clonazepam	69,620	114.8
Drugs to Treat Insomnia or Anxiety: Lorazepam	42,602	104.3
Illicit Drugs: Ecstasy (MDMA)	22,816	123.2
Narcotic Pain Relievers: Oxycodone Products	175,949	242.2
Narcotic Pain Relievers: Morphine Products	34,282	133.3
Narcotic Pain Relievers: Hydrocodone Products	104,490	124.5
Narcotic Pain Relievers: Fentanyl Products	22,143	117.5
Metabolic Agents: Antidiabetic Agents	28,088	223.6
Muscle Relaxants: Carisoprodol	31,763	100.6

Source: 2004 to 2009 SAMHSA Drug Abuse Warning Network (DAWN).

For patients aged 20 or younger, ED visits resulting from misuse or abuse of pharmaceuticals increased 45.4 percent between 2004 and 2009 (116,644 and 169,589 visits, respectively). Among patients aged 21 or older, there was an increase of 111.0 percent. There were no significant changes in the level of ED visits involving illicit drugs for either age group or those involving underage drinking for those aged 20 or younger.

Trends in ED Visits Involving Adverse Reactions to Drugs: 2005 to 2009

ED visits involving adverse reactions to pharmaceuticals taken as prescribed increased 82.9 percent between 2005 and 2009, from 1,250,377 visits in 2005 to 2,287,273 visits in 2009 (Figure 3).⁹ The rate for adverse reactions ranged from 422.8 visits per 100,000 population in 2005 to 745.0 visits per 100,000 population in 2009 (Table 3).

The majority of adverse reaction visits were made by patients who were 21 or older (1.9 million visits, or 877.3 visits per 100,000

population). In particular, among patients aged 65 or older, the rate was 1,856.8 visits per 100,000 population. This rate represents an 89.2 percent increase from the number of adverse reaction ED visits among patients aged 65 or older in 2005. The type of drugs most commonly involved in adverse reactions for patients aged 65 or older in 2009 were blood modifiers (e.g., coumarin; 405.8 visits per 100,000 population). Other drugs found at high levels were cardiovascular drugs, including beta blockers (328.5 visits per 100,000 population), pain relievers (296.9 visits per 100,000 population), and cancer drugs (117.1 visits per 100,000 population).

Discussion

The findings in this report demonstrate the increasing importance of pharmaceuticals to total drug-related ED visits. Pharmaceuticals, even those that are sometimes abused, can have very positive effects when used as prescribed or directed. However, when misused or abused, they can lead to serious negative side effects. Between

2004 and 2009, the number of ED visits involving the misuse or abuse of pharmaceuticals increased substantially. About twice as many people experienced ED visits caused by the misuse or abuse of pharmaceuticals in 2009 than in 2004, and this pattern was consistent across age groups.

The findings related to the misuse or abuse of pharmaceuticals call attention to several public health challenges. First, pharmaceuticals do not have the stigma of being illegal, and therefore health educators must change the perception that pharmaceutical drugs are safe to use recreationally. Another public health challenge is ensuring that pharmaceuticals are available for people who depend on them therapeutically, while finding a way to limit access to people who misuse or abuse them. The findings in this report also highlight the importance of heightening emergency room medical staff's awareness of nonmedical use of pharmaceuticals, because these personnel might be the first responders to people in need of intervention and treatment.

The findings in this report also underscore the growing public health problem of adverse reactions to pharmaceuticals when taken as prescribed or recommended. Recently, there has been increased attention on refining drug warning labels (i.e., the text and icons used) to increase patients' understanding of prescription drugs' potential side effects and possible interactions with other drugs and alcohol, regardless of literacy level.^{10,11} Beyond these efforts, the increased use of technology in pharmacies—such as software that allows pharmacists to keep a record of a patient's medications and potential interactions or contraindications—is another avenue to increase drug safety. Patients can reduce the potential for adverse reactions by keeping an updated list of all the drugs and supplements that they take so they can present it to doctors and pharmacists whenever they are prescribed a new medication.

End Notes

- ¹ Owens, P. L., Mutter, R., & Stocks, C. (2010). *Mental health and substance abuse-related emergency department visits among adults, 2007* (Statistical Brief No. 92). Rockville, MD: Agency for Healthcare Research and Quality. [Available as a PDF at <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb92.pdf>]
- ² Center for Behavioral Health Statistics and Quality. (2010). *Drug Abuse Warning Network, 2009: Selected tables of drug-related emergency department visits*. Rockville, MD: Substance Abuse and Mental Health Services Administration. [Available at <https://dawninfo.samhsa.gov/data/>]
- ³ The adverse reactions category of drug-related ED visits represents visits related to any negative consequences of using a prescription or over-the-counter (OTC) pharmaceutical for therapeutic purposes and includes visits related to adverse drug reactions, side effects, drug-drug interactions, and drug-alcohol interactions. Although adverse reactions that involve illicit drugs are generally excluded from this category, DAWN estimates for adverse reactions may contain a small number of drugs from the "major substances of abuse" (or "illicit") DAWN category when there is a legitimate pharmaceutical version of a drug that DAWN classifies as illicit or when a pharmaceutical inhalant (such as an anesthetic gas) is involved.
- ⁴ Within DAWN, the drug misuse or abuse category is a group of ED visits defined broadly to include all visits associated with illicit drugs, alcohol abuse among patients aged 20 or younger, and the misuse or abuse of pharmaceuticals.
- ⁵ DAWN also collects information on patients seeking detoxification or treatment services (0.2 million) and drug-related suicide attempts (0.2 million).
- ⁶ Within DAWN, the category "misuse or abuse of pharmaceuticals" includes cases in which someone takes more than the prescribed or recommended dose of a prescribed or OTC pharmaceutical, takes a pharmaceutical prescribed for another individual, or is deliberately poisoned with a pharmaceutical by another person. Also included are ED visits involving the concurrent use of pharmaceuticals with illicit drugs and/or alcohol and use of alcohol only by persons aged 20 or younger.
- ⁷ Because multiple drugs may be involved in a single visit, the sum of visits by type of visits will be greater than the number of visits, and the sum of percentages will be greater than 100 percent.
- ⁸ Alcohol involvement includes use of alcohol in combination with other drugs for patients of all ages and use of alcohol only for persons aged 20 or younger. Underage drinking includes both use of alcohol in combination with other drugs and use of alcohol only for persons aged 20 or younger; underage use of alcohol only is considered to be drug misuse or abuse.
- ⁹ Data for adverse reactions to pharmaceuticals are not available for 2004 because of data limitations.
- ¹⁰ Shrank, W. H., Parker, R., Davis, T., Pandit, A. U., Knox, J. P., Moraras, P., Rademaker, A., & Wolf, M. S. (2010). Rationale and design of a randomized trial to evaluate an evidence-based prescription drug label on actual medication use. *Contemporary Clinical Trials*, 31(6), 564-571.
- ¹¹ Webb, J., Davis, T. C., Bernadella, P., Clayman, M. L., Parker, R., Adler, D., & Wolf, M. S. (2008). Patient-centered approach for improving prescription drug warning labels. *Patient Education and Counseling*, 72(3), 443-449.

Suggested Citation

Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality. (December 28, 2010). *The DAWN Report: Highlights of the 2009 Drug Abuse Warning Network (DAWN) Findings on Drug-Related Emergency Department Visits*. Rockville, MD.

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Findings from SAMHSA's 2009 Drug Abuse Warning Network (DAWN)

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The Drug Abuse Warning Network (DAWN) is a public health surveillance system that monitors drug-related morbidity and mortality. DAWN uses a probability sample of hospitals to produce estimates of drug-related emergency department (ED) visits for the United States and selected metropolitan areas annually. DAWN also produces annual profiles of drug-related deaths reviewed by medical examiners or coroners in selected metropolitan areas and States.

Any ED visit related to recent drug use is included in DAWN. All types of drugs—licit and illicit—are covered. Alcohol involvement is documented for patients of all ages if it occurs with another drug. Alcohol is considered an illicit drug for minors and is documented even if no other drug is involved. The classification of drugs used in DAWN is derived from the Multum *Lexicon*, copyright 2010 Lexi-Comp, Inc., and/or Cerner Multum, Inc. The Multum Licensing Agreement governing use of the *Lexicon* can be found at http://dawninfo.samhsa.gov/drug_vocab.

DAWN is one of three major surveys conducted by the Substance Abuse and Mental Health Services Administration's Center for Behavioral Health Statistics and Quality (SAMHSA/CBHSQ). For more information on other CBHSQ surveys, go to <http://oas.samhsa.gov>. SAMHSA has contracts with Westat (Rockville, MD) and RTI International (Research Triangle Park, NC) to operate the DAWN system and produce publications.

For publications and additional information about DAWN, go to <http://DAWNinfo.samhsa.gov/>.



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